

Denali Commission Award 1465 - Pilot Station Bulk Fuel Upgrades
Final Closeout Summary Report September, 2018
Submitted by Alaska Village Electric Cooperative, Inc.

This Closeout Summary Report is filed with the federal grantor agency the Denali Commission (“Denali” or “DC”) by the grantee partner Alaska Village Electric Cooperative, Inc. (AVEC). The federal grant award covered by this report and this project is 01465-00 (or “1465”), as subsequently amended. The participants are AVEC, Pilot Station, Inc. (Corporation), and the City of Pilot Station (City). AVEC was the grantee of DC funding for this project, and managed the project for all participants. AVEC owns and operates its new facilities, and is responsible for future maintenance thereof. City owns the Corporation’s facilities and leases them to the Corporation, and under that long term lease the Corporation is responsible for future maintenance thereof. City also owns its facilities and is responsible for future maintenance thereof. All facilities are further described below.

This project is being closed because the project is complete and is in full operation, and the funding has expired. This report represents the project status as of September 30, 2018. As of that date, Direct Cost outlays exceeded funding by \$2,651, and no federal funds are available for deobligation; whereas Indirect Cost funding exceeded outlays by \$7,778, and all of this is federal funds available for deobligation. This is in addition to one earlier, mid-project deobligation by award amendment.

Background – AVEC is a member-owned, non-profit rural electric cooperative serving 58 rural Alaskan communities, all of which (with one exception) are located well off the state’s road system and accessible year-round only by aircraft, and accessible by ship only seasonally. None of AVEC’s member communities is connected to the state’s power grid. Consumers in these rural Alaska communities pay some of the highest electric power rates and fuel prices in the U.S.

This grant benefits the remote rural community of Pilot Station, Alaska (population 625). Pilot Station is a remote rural Alaskan community, a Yup’ik Eskimo village with a commercial fishing and subsistence lifestyle, located on northwest bank of the Yukon River, surrounded by the Yukon Delta National Wildlife Refuge, 11 miles east of St. Mary’s and 87 miles north of Bethel (the nearest community with extensive state government services). It lies at approximately 61.938 North latitude and -162.88 West longitude (Sec. 5, T021N, R074W, Seward Meridian). The area has a maritime climate; water equivalent precipitation averages 16 inches annually, including an average 60 inches of snowfall; summer temperatures average 41 to 57 degrees F, winter temperatures average 6 to 24 degrees F, and extremes have been measured from 83 to -44 degrees F. Pilot Station is easily accessible by river-going vessels for delivery of major freight, however the Lower Yukon River in this area is ice-free only from mid-June through October. The State of Alaska maintains a gravel airstrip accessible year round for passenger travel and mail and freight delivery. The community incorporated in 1969 under state law as a second class city. As of July, 2017, the retail prices of gasoline and diesel/heating fuel were \$6.03 per gallon and \$7.32 per gallon, respectively.

Activities - The scope for this project and award involved the construction and execution of (all gallon capacities shown throughout this document are stated as gross (shell) capacity figures):

- a new 216,000-gallon diesel-fuel-only bulk fuel storage tank farm for AVEC, to supply its adjacent electric power plant (relocated concurrent to this project under separate DC award 1464); both facilities are located on Airport Road just south of the community’s sewage lagoon

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and just north of the community's school in the north-central portion of town; this newly-developed site was chosen for its location in an industrial sector of the community and its consequent and convenient proximity to the redeveloped Corporation tank farm;

- a new 221,000-gallon bulk fuel storage tank farm for the Corporation, to store and dispense both diesel fuel and gasoline, and dispensing equipment to support retail sales of both fuels, and bulk diesel/heating fuel fleet dispenser to fill local fuel trucks for commercial & residential heating fuel deliveries; this portion of the project involved expanding the existing gravel pad foundation and constructing a new lined impoundment at the existing Corporation tank farm located just to the east of the new AVEC tank farm in the same general area of town; this is a redeveloped, expanded site built over and next to the pre-existing community tank farm;
- a new 35,000-gallon bulk fuel storage tank farm for the City, to store and dispense both diesel fuel and gasoline for City use, including fleet dispensing of diesel fuel to support City services; with space within the spill-protected containment cell for future post-project installation of one additional 10,000-gallon vertical tank; located on Airport Road in the eastern portion of town; this is a redeveloped site situated adjacent to the City shop;
- two new single-product barge headers located at the river bank, and two new single-product fill pipelines running from the barge headers to the three new tanks farms, all used seasonally to fill all bulk fuel storage tanks from river-going delivery tanker barges, laid out as follows:
 - for diesel/heating fuel: a 4-inch diameter pipeline running 1,760 feet from its dedicated barge header to the AVEC tank farm; with connection at its terminus to existing underground diesel pipeline spurs that fill existing tanks located next to (and which serve the fuel needs of) the community's new school and its old school; and also with connections to two shorter spurs along the line to the Corporation tank farm (4-inch diameter spur line running 80 from the main line) and to the City tank farm (3-inch diameter spur line running 150 feet from the main line), and
 - for gasoline: a 3-inch diameter pipeline running 1,760 feet from its dedicated barge header to the Corporation tank farm, with connection to one shorter spur along the line to the City tank farm (3-inch diameter line running 150 feet from the main line);
 - All fill pipelines are buried and made of cathodically-protected steel pipe;
- and associated site work for the pipelines and the tank farms, including earthen-dike containment basins and secondary containment; interconnecting fuel piping, meters, pumps, electrical controls, lighting improvements, and other reasonable and necessary equipment; provision of EPA and Coast Guard regulatory plans, and required spill contingency equipment at each facility, and

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- treatment of tanks taken out of service as a result of this project, as follows:
 - all tanks in the former AVEC tank farm were cleaned and rendered permanently unusable, and placed within security fencing at the former AVEC tank farm site;
 - at the former combined Corporation and City tank farm, which became the site for the new Corporation-exclusive tank farm: two 10,000-gallon horizontal tanks were removed, refurbished and installed into the new City tank farm, as described further below, and all remaining tanks were cleaned, cut up and disposed of in the community's landfill.

All tanks in the new tank farms are single-wall, and are situated inside containment cells designed and constructed according to applicable rules and regulations governing spill prevention and protection.

The parcels of land for all three new tank farms were provided by the Corporation and the City. As of the date of this report, all construction included in the scope of award 1465 is now complete, and the facilities are operating satisfactorily.

AVEC has long maintained prioritized rankings of its RPSU and BFU facilities, with the goal of first upgrading those with the highest environmental risk exposure; and/or those presenting the greatest opportunity for increases in fuel efficiency (defined as kilowatt-hours produced per gallon of fuel), such as through consolidation and interconnection of communities, or through replacement of older, less efficient generators and control systems, or through incorporation of renewable energy sources, etc. Due to the high environmental risk exposure of their original location within the flood zone of the Yukon River, the AVEC power plant in Pilot Station was relocated under Denali award 1464 and the bulk fuel tank farm that supplies the power plant was entirely decommissioned and replaced with new facilities under this award 1465; these two awards were funded, and the two projects executed, concurrently.

This project and the facilities completed under award DC 1465 were developed and built as part of an amalgamated, long term strategic program of energy projects for Pilot Station and the nearby communities of St. Mary's and Mountain Village (situated 12 and 38 miles west of Pilot Station, respectively). Under an earlier DC-funded project 54A, AVEC engaged consulting engineering firm NANA Pacific to broadly evaluate sub-regional energy infrastructure solutions for St. Mary's, Mountain Village and Pilot Station, and also to include Marshall, another community in the area. NANA Pacific published its data, findings and recommendations in a Pre-Conceptual Design report (Pre-CDR) on March 26, 2007. The Pre-CDR recommended further consideration of a sub-regional power system involving a prime power plant in one community, and interties to one or more of the other communities, and retiring power plant(s) and replacing them with standby backup power module(s) in each of the intertied communities. Further studies conducted in 2007-10 funded by DC award 356-07 (Project 73A) Intertie Studies and Transmission Development, and in 2007-10 under DC award 1347 St. Mary's Interties Design and Permitting, examined the feasibility of interconnecting and powering all three communities from a single prime power plant. These studies concluded that connecting Mountain Village and St. Mary's into one electric power grid was indeed

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feasible; however terrain and surface water conditions on any proposed intertie route between Pilot Station and St. Mary's made that particular connection inadvisable. This led AVEC to decide Pilot Station should continue to host its own power plant. Meanwhile, historic seasonal flooding in and near the Pilot Station power plant grounds made it imperative the plant be moved to higher ground.

In 2012, funded by DC preconstruction award 1398, AVEC engaged consulting engineers CRW Engineering Group, LLC (CRW) to evaluate electric power and bulk fuel storage facilities in Pilot Station. CRW gathered power and fuel supply and demand facts and data from AVEC and other participants, from private enterprises serving the community, from earlier published studies and energy planning documents, and from public databases. CRW personnel made site visits to Pilot Station in March 2013 and June 2013. CRW and AVEC personnel presented the draft CDR in Pilot Station to the other participants and the community at large on August 26, 2014, at which time the City and the Corporation consented to the project as presented, executed documents granting all necessary site control, and executed a Memorandum of Agreement outlining the participants' roles in and responsibilities to the project moving forward.

In its CDR, CRW identified, described and evaluated the seven existing tank farms and one planned tank farm, as well as existing barge headers, fill pipelines, and dispensing facilities; the AVEC power plant and distribution system; population trends; historic and projected future electric power supply and demand and fuel consumption required to satisfy the power demand; historic and projected future transportation, space heating and other non-electric energy demand and fuel consumption required to satisfy that demand; potential local renewable energy options; general geotechnical conditions and flood considerations; permitting including relevant regulations and codes governing environmental law, spill response, fire, electrical, etc.; local resources and materials relevant to heavy construction activities; site control considerations; and other pertinent facts, trends, requirements and resources. CRW then outlined three comprehensive design alternatives and ranked them. The top-ranked, preferred alternative was Alternative #3, which called for relocation of the existing AVEC power plant to higher ground away from its historic location in the flood-prone area very near the river bank, and construction of the three tank farms and other upgrades essentially as described above. Lower-ranked alternatives centered around replacement of the existing AVEC power plant by a new power plant, and connection by a new intertie to a prime power plant in nearby St. Mary's.

As noted, the CRW CDR also reevaluated in its Alternative #2 the concept of connecting the Pilot Station power grid to St. Mary's by means of an intertie. This intertie alternative would need to cross terrain considered very difficult to access for maintenance or emergency repairs in summer, and necessitated significant BFU and RPSU in St. Mary's, where the prime power plant for the two (or three) communities would then have been located. The CDR concluded the required St. Mary's upgrades would likely take too many years to achieve, leaving the existing Pilot Station power plant and its tank farm vulnerable in the meantime to flooding in its present location. Further, the total cost of Alternative #2 including the intertie was estimated to be substantially higher than relocation of the existing Pilot Station power plant under Alternative #3. Finally, the existing power plant was judged to be both relocatable and suitable for reuse, and able to provide continued reliable electric power into the foreseeable future; these conclusions in turn

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led to a lower ranking for Alternative #1, which featured replacement of the existing power plant with a new facility at much higher cost.

The CDR envisioned no current upgrades to bulk fuel storage facilities serving the local schools (operated by the Lower Yukon School District), nor to the City's water treatment plant. The CDR identified several tanks suitable for reuse; tanks actually reused are noted in the tank table below. Also, the City had acquired certain new BFU components including one 10,000-gallon vertical tank, a dual-product retail dispenser and a bulk transfer hose reel, all of which it contributed to the project for installation into its tank farm.

Once the CDR was complete and accepted, preconstruction award 1398 then also funded the ready-for-construction design of all bulk fuel storage facilities constructed under award 1465, as well as the power plant relocation accomplished under award 1464. To facilitate these designs, this scope included a geotechnical study and report completed by Golder Associates in subcontract to CRW; and topographic survey, environmental assessment and permitting, site control, survey and platting, and fire marshal plan approval, all completed by CRW.

This project was constructed following a competitively-bid, fixed-price contracting model according to specifications and contract documents published by CRW and reviewed by AVEC. AVEC developed a strategic plan to complete two major community infrastructure projects in Pilot Station (tank farms construction and power plant relocation) concurrently in order to encourage bidding construction contractors to plan for optimal utilization of construction resources, especially heavy construction equipment (certain pieces are relatively expensive and would have to be barged in), fill material, and skilled labor, to result in lower construction costs overall. The contract was advertised for bid in January 2016; two responsive bids were received and the contract was awarded in March 2016. STG, Inc. (STG) was the low bidder for the overall bid and each of the three sub-portions of it: AVEC tank farm, Corporation and City tank farms, and relocation of the AVEC power plant. The entire combined construction contract with STG was initially valued at \$6,631,150 and ultimately totaled \$6,836,666 with change orders.

AVEC procured the sixteen 27,000-gallon single-wall tanks (eight for each of the AVEC and Corporation tank farms) on a competitive bid solicitation outside of the construction contract; six bids were received and the fabrication contract was awarded January 2016. AVEC inspected the completed tanks upon their delivery to Port of Bellingham in May 2016 and they were then shipped by ocean barge to Pilot Station.

STG's procurement and construction activities commenced in late winter - spring 2016. By June 2016 all major materials and all heavy construction equipment necessary for construction of all three tanks farms were on site in Pilot Station. The project was able to procure all fill material locally and avoid importing fill. Through the summer and fall and prior to winter shutdown, STG completed all earth work (gravel pad), installed secondary containment, placed bulk tanks, and installed all interconnecting piping, mechanical components, electrical components, and fencing on the AVEC tank farm; and installed the marine header, and the underground fill pipelines to all three sites. AVEC's existing spill containment equipment was considered compliant with regulations, and it was moved from AVEC's old tank farm to its new facilities. CRW and STG completed the substantial completion inspection of the AVEC tank farm

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October 6, 2016, and developed a punch list of remaining work to complete. The new AVEC tank farm was filled from a tanker barge in fall 2016. STG then completed all punch list items and a final inspection of AVEC facilities occurred on May 31, 2017.

Construction work commenced again in May 2017. Spring runoff caused some slope failure on the AVEC tank farm; AVEC and CRW met with STG on site to determine necessary remediation; the slope was regraded and a diversion ditch was installed. STG completed all earth work (gravel pads), installed secondary containment, placed bulk tanks, and installed all interconnecting piping, mechanical components, electrical components, and fencing on the Corporation and City tank farms. The project provided spill containment equipment at the Corporation tank farm, stored ready for deployment inside a metal shipping container inside its fenced yard. CRW and STG completed the substantial completion inspection of the AVEC tank farm October 6, 2016, and developed a punch list of remaining work to complete. STG then completed all punch list items and a final inspection of Corporation and City facilities occurred on February 2, 2018. In early 2018, redline drawings, as-builts, and operation and maintenance manuals were prepared and submitted for review and approval.

The three new tank farms built under DC 1465 feature the following tanks and fuel capacities:

Location (Participant)	Type	Source	Use	Number of Tanks	Gross Capacity per Tank (Gal)	Total Capacity (Gallons)
AVEC tank farm	Bulk	New	Diesel	8	27,000	216,000
	AVEC Total			8		216,000
Corporation tank farm	Bulk	New	Diesel	4	27,000	108,000
			Gasoline	4	27,000	108,000
	Dispensing (Note 1)	New	Diesel	1	2,500	2,500
			Gasoline		2,500	2,500
	Corporation Total			9		221,000
City tank farm	Bulk (Note 2)	Refurbished	Diesel	2	10,000	20,000
		New (Notes 3,4)	Gasoline	1	10,000	10,000
	Dispensing (Note 1)	New	Diesel	1	2,500	2,500
			Gasoline		2,500	2,500
	City Total			4		35,000
DC Award 1465 Pilot Station BFU Total				21		472,000

Note 1: this is a split tank with an internal wall separating the two fuel products.

Note 2: these 3 tanks were contributed to project by City (in-kind contribution).

Note 3: this City gasoline tank is a vertical tank; ALL other tanks are horizontal.

Note 4: City also procured a second 10,000-gallon vertical gasoline bulk tank for future use; not installed as part of this project.

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The three new Pilot Station tank farms were designed and built to comply with code requirements and environmental regulations promulgated by the State of Alaska (in the 2009 edition of the International Fire Code and the International Building Code, adopted by the Dept. of Fire and Life Safety); by the U.S. Environmental Protection Agency (as to the Spill Prevention Control and Countermeasures (SPCC) Plan, and Facility Response Plan (FRP)); and by the U.S. Coast Guard (as to the Facility Response Plan and Operations Manual).

Funding and Costs – The Denali Commission, AVEC, the Alaska Energy Authority (State of Alaska) and the City of Pilot Station provided funding for this project as shown in the following table:

DC Award/Project 1465 Pilot Station Bulk Fuel Upgrades Funding and Outlays	Federal Portion of Award - Denali Commission	Match Portion of Award (Note 1)	Total All Sources
Funding - Direct Costs portion	\$ 5,669,200	\$ 1,784,800	\$ 7,454,000
Funding - Indirect Costs portion	\$ 16,968		\$ 16,968
Total Funding (Budget)	\$ 5,686,168	\$ 1,784,800	\$ 7,470,968
Eligible Outlays - Direct Costs	\$ 5,671,851	\$ 1,721,993	\$ 7,393,844
Eligible Outlays - Indirect Costs	\$ 9,190		\$ 9,190
Total Eligible Outlays	\$ 5,681,041	\$ 1,721,993	\$ 7,403,034
<i>Direct Costs: Funding in Excess of Outlays</i>	\$ (2,651)	\$ 62,807	\$ 60,156
<i>Indirect Costs: Funding in Excess of Outlays</i>	\$ 7,778	\$ -	\$ 7,778

Note 1: Match portion of funding (\$1,784,800) consists of: AVEC cash match relative to its tank farm (\$807,000); plus State of Alaska, Alaska Energy Authority cash match relative to the Corporation and City tank farms (\$949,520); plus the in-kind value of the new bulk gasoline tank and dispensing equipment and other components the City contributed to the project relative to the City tank farm (\$28,280).

Direct Costs: federal outlays exceeded federal funding (as amended by one earlier deobligation amendment) by \$2,651; this is considered an additional AVEC match portion and there is no federal amount available for deobligation. Indirect Costs: funding (as amended by one earlier deobligation amendment) exceeded outlays by \$7,778; all of this is federal funds and is available for deobligation.

Conclusions – Planning, designing and constructing several major infrastructure facilities in one community over an approximately ten-year timeframe yielded substantial efficiencies in the use of heavy construction equipment, labor, freight, and design resources. The measurable success of all of these projects was (and will continue to be) greatly due in part to the cooperation and support of these projects by the City of Pilot Station, Pilot Station, Inc., and members of the community. The contractor performed satisfactorily

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and to contractual expectations. The completed project meets all current regulations and codes governing electrical generation facilities of this size.

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CRW Engineering Group, LLC: *Bulk Fuel & Power Plant Upgrade Project, Conceptual Design Report, Pilot Station, Alaska*. Prepared for Alaska Village Electric Cooperative, December, 2015.

Golder Associates; *Geotechnical Findings and Recommendations, Proposed Power Plant and Bulk Fuel Facility, Pilot Station, Alaska*; July 16, 2015.

NANA Pacific, Inc.; *Pre-Conceptual Design, Pilot Station Bulk Fuel Tank Farm and Power System Upgrade*; March 26, 2007; Prepared for Alaska Village Electric Cooperative.